

National Aeronautics and Space Administration
Commercial Space Committee
of the
NASA Advisory Council

December 14, 2010
NASA Headquarters
Washington, DC

Meeting Minutes

John Emond
Executive Secretary
Commercial Space Committee

Bretton Alexander
Chair, Commercial Space Committee

*Meeting report prepared by
Jill Hacker
Zantech IT*

CONTENTS

PROCEEDINGS.....	3
Introduction	3
Public Outreach.....	3
NASA Commercial Space Working Group	6
Discussion: Assessment of Committee Efforts	9
APPENDIX A, MEETING AGENDA	13
APPENDIX B, COMMITTEE MEMBERSHIP	14

Proceedings

Introduction

Committee members in attendance:

- John Michael Lounge
- Major General Donald Hard
- Patti Grace Smith
- Bretton Alexander, Chair
- Lon Levin, Deputy Chair

John Emond opened the public part of the meeting at 1:30 pm. He explained that this part of the meeting was open under the Federal Advisory Committee Act (FACA) but questions would not be taken from the audience. He explained, further, that once cleared, the meeting minutes would be on the Office of Chief Technologist's Web site, and probably on the Space Operations Mission Directorate's Web site as well. He invited participants with questions about where to find the minutes to e-mail him at john.l.emond@nasa.gov.

Mr. Emond introduced the committee members to the audience.

Public Outreach

Lars Perkins, Acting Chair, Education and Public Outreach Committee

Mr. Perkins, an entrepreneur in software technology, was introduced to give a presentation about education and public outreach. Miles O'Brien, who had headed the Education and Public Outreach Committee but was presently on sabbatical, was connected by telephone.

Mr. Perkins discussed integration of public outreach into the Commercial Orbital Transportation Services (COTS) programs and what public outreach committees would like to do. He explained that NASA has always been transparent, even in bad times. A transparent NASA involves, informs, and inspires. This drives support to continue investment. Declining public awareness could translate into declining public support and therefore less funding.

At the recent launching of Falcon 9, SpaceX, the company responsible for the mission, had given NASA only as much access to the launch as a journalist would

have had. SpaceX, on the other hand, had excellent footage, which they broadcast, but to which they would not provide NASA access. It was an explicit rejection. SpaceX would not have been prepared to deal with the public had the mission gone wrong. The post-mission press conference was a missed opportunity, with Elon Musk, SpaceX CEO, a reluctant participant. Partners on the commercial side must be better prepared for all possible outcomes and better prepared to work with NASA about communicating with public.

SpaceX needs to understand the importance of public relations. Public relations should be included in SpaceX's contract. The company's fear of exposing trade secrets must be addressed rather than allowed to stand as an obstacle.

Mr. Perkins proposed a joint recommendation from the Education and Public Outreach Committee and the Commercial Space Committee to the Administrator to:

- encourage current COTS contractors to integrate public outreach into mission planning and operations and
- include specific responsibilities, requirements, and guidelines for public outreach in all new COTS contracts.

Mr. O'Brien commented that is crucial that NASA keep the American people engaged so that the average person can see the possibility that he or she will get to go into space.

Mr. Perkins explained that the Education and Public Outreach Committee had not been in discussion with the other COTS participant (besides SpaceX) but had been in discussion with the public affairs office at NASA HQ. Mr. O'Brien explained that Robert Hopkins, NASA's Chief of Strategic Communication, and David Weaver, NASA Assistant Administrator for the Office of Communication [I'm guessing that these people are the "Bob and Dave" referred to in the meeting] had encouraged the Education and Public Outreach Committee to make public affairs a mission requirement and it is natural for that requirement to carry over into contracting. Mr. Musk gives out a lot of information about what happens during flights, but he does so only two or three days after it takes place, while news consumption is in real time.

Mr. O'Brien explained that it does not matter who covers commercial space missions, as long as these missions do get covered. Ironically, the greater the effort to control the message, the less control one has. One has to tell one's own bad news; if the Falcon 9 mission had gone wrong and the picture had gone to snow (that is, if televising had stopped abruptly) as planned, reporters would have written stories and SpaceX would have lost the high ground. Ms Smith commented that the public has a desire and a right to the message of space.

Mr. O'Brien explained that Mr. Musk believes that telling the public about a COTS disaster would mean the end of the COTS program. It is difficult to influence Mr. Musk to do more in public relations, because what he has done in that area already is beyond the contract's requirements. But public relations requirements should be standard in COTS contracts.

A discussion ensued about how to set contracts up to require public relations. Mr. Lounge suggested public relations milestones in the contract. Mr. Alexander suggested requiring a press conference. Mr. Levin suggested that the public relations be done from NASA's side: NASA may publicize events as NASA chooses.

Mr. Perkins pointed out that NASA is not being provided access to SpaceX events beyond the limit set up for journalists. Mr. Weaver believes NASA needs SpaceX to commit to be present at press conferences and to develop the message. He said that it would have been a disaster if the SpaceX launch had gone wrong and no SpaceX representative had been at the press conference. Mr. O'Brien commented that Mr. Musk had been present at the SpaceX press conference.

Mr. O'Brien recalled the Challenger failure, which had been a media disaster, and the Columbia failure, which had not. With Columbia, NASA was forthcoming and never lost control of the message.

In response to a general question from Mr. Emond about how the Commercial Space and Education and Outreach Committees can work toward commercial capability, Mr. O'Brien suggested a strategy of engaging people and creating enthusiasm about commercial space, emphasizing that at this time only 500 humans have ever left the planet and gone to space but it will be 500 per month and eventually 500 per week and anyone can imagine that that number could include him or her.

Mr. Perkins commented the success of the Falcon 9 effort was attributable partly to luck. COTS public relations needs to be systematized and formalized to be prepared to respond to unsuccessful missions. Mr. Levin pointed warned against shifting responsibility for public outreach to the commercial entity. Mr. Perkins clarified that the suggestion was to ask the commercial entities to cooperate with NASA. Mr. O'Brien said NASA's job is to carry the water on public outreach – but that requires access. As a proxy to the taxpayer, NASA has a responsibility and a right to inside access.

Mr. Levin said it is Mr. Musk's job to maximize shareholder value and NASA's job to come up with the commercial framework, make sure it happens, and tell the public about the program's successes. While it may be in Mr. Musk's best interest to continue to cooperate with NASA, it may not be appropriate for NASA to make that choice for him. At the same time, companies have a vested interest different from NASA's in how much the public knows about a program. Mr. Alexander pointed out that NASA has an obligation under the Space Act to carry out public relations; he asked what obligation extends to the company. Mr. Levin said it is not a legal

obligation for the company; he asked whether it should be an obligation included in contracts. Mr. O'Brien suggested that Mr. Musk's business does not always jive with the access for ordinary citizens. But there is middle ground.

Mr. Perkins asked if public relations should be a contract obligation for a commercial space company. He suggested that rather than create a legal obligation with a lot of teeth in it that would demand bureaucratic behavior, NASA could have the company work with NASA to develop a plan for outreach. General Hard agreed, saying the company would protect its right to privacy to the hilt; a bureaucratic public relations requirement might deter a company from signing. Mr. Perkins suggested that the teeth do not have to be piranha teeth; the requirement could be just to integrate public relations planning into the process. Mr. Levin agreed, suggesting that cooperation be encouraged and no metrics be required. Once "you must" is in a contract, there needs to be a provision for company default. Mr. Perkins suggested a fairly broad recommendation rather than a bureaucratic process. Mr. O'Brien agreed.

Mr. Alexander suggested that contracts should "encourage" public relations. He asked Mr. Perkins to suggest some wording. Mr. Perkins agreed to look for language that will not get distorted into a bureaucratic obligation that would flatten the entrepreneurial spirit. Mr. O'Brien offered to have the Education and Public Outreach Committee propose some language informed by the discussion.

NASA Commercial Space Working Group

Gregor Hanuschak

Mr. Hanuschak represented the Office of the Chief Technologist (OCT). He discussed new efforts in commercial space that OCT is leading for the agency. These efforts are new capabilities that support the White House space policy, particularly its provisions to energize, enable, and facilitate new commercial space capabilities. The top two priorities are low-cost access to space as well as in-space servicing.

The Commercial Space Working Group has started to identify nontraditional options for how to help companies in space-related industries. Investment is a barrier in many across-the-board capability areas.

To support the National Space Policy, the Commercial Space Working Group has had a series of workshops, starting last June, each attended by two to five representatives from each of NASA's ten centers. Robert Braun, NASA's Chief Technologist, charged the group to determine the priorities on which NASA should focus its attention.

The working group evaluated several areas for benefit to NASA; economic growth; and science, technology, engineering, and math (STEM) education. The group ranked low-cost access to space as NASA's top priority and commercial and space servicing as its second priority. It was suggested that companies should also

participate in ranking priorities for commercial areas. A working group was set up for each of several commercial areas.

Mr. Alexander asked for clarification on what was being prioritized and for what purpose. Mr. Emond explained that these various working groups identified areas of priority and low-cost access to space, whether for NASA's purposes or for commercial development.

Mr. Alexander asked if that meant that the goal was to have NASA figure out how to enable the top priorities commercially for NASA's use, or if it was for NASA to support the commercial world in doing something. He asked what the outcome was intended to be. Mr. Hanuschak replied that the working group was still determining what the intended outcome was; this was the first workshop, in which working groups were set up to understand industries better. He explained that the group was set up to help NASA understand industry. The Low-Cost and Reliable Access to Space (LCRATs) group had spoken to 30 different companies; the Commercial Space Working Group had also listened to companies. In every case, the primary barrier preventing business in space was markets and the second was investment.

The Commercial Space Working Group is looking at ways to address these issues. The third workshop looked at economic incentives; the group considered potential solutions, including investment tax credits for commercial space and loan guarantees. They had speakers from the Maritime Administration and the Department of Energy. They have also spoken to other agencies, including the Department of Commerce.

Mr. Emond quoted Lynn Harper at NASA Ames Research Center as saying that from a national perspective there is no government agency whose job is to foster commercial space. NASA uses the commercial sector for its goals, but has not set commercial space as its primary objective. Mr. Levin suggested that the question should be, "Should NASA be organized to energize, enable, and foster the space economy for public benefit?"

Mr. Alexander pointed out that a program with money can enable a capability. He referred to COTS and Commercial Crew. Roadmaps and priority lists, on the other hand, do not work effectively. If a proposed capability has no NASA customer and commercial customers are not willing to invest and develop it, there might not be a point to NASA's developing it. Mr. Levin asked whether the overarching goal of the effort is to energize, enable, and foster the space economy or whether it is that NASA wants some tasks that NASA does now to be commercialized.

Mr. Hanuschak explained that the Working Group is considering only what is best for the Nation. Mr. Lounge asked whether the goal is for commercial providers to upport NASA's mission and whether it is in the 1958 Space Act that part of NASA's job is to foster the space economy for public benefit. Mr. Alexander replied that the Space Act (possibly the original or possibly the 1984 Commercial Space Act) does

talk about commercializing, but not about energizing, enabling, and fostering. General Hard commented that the goals are closely related in low-cost access to space. The barriers are market and investment. He asked what NASA's role should be in encouraging investment. Mr. Alexander replied that NASA may not have a role, other than for transportation to the International Space Station (ISS).

General Hard asked whether NASA is tasked to develop commerce in space. Mr. Lounge replied that NASA is tasked to buy commercial services when such services are available and appropriate for NASA's mission needs. Mr. Alexander cautioned about the danger of overplaying the term *commercial* to the point interpreting things to be commercial when they are not. NASA needs to build commercial capabilities, but NASA also has to meet its mission needs and stick to its charter. For example, low-cost, reusable access to space is not necessarily an outcome of any NASA need or commercial push.

Mr. Emond pointed out that the interpretation of the phrase in the NASA charter "NASA shall seek and encourage, to the fullest extent possible, the commercial use of space" changes over time. General Hard commented also that there is an interpretation of *commercial* in the charter that means a market sustains itself and profit is made from it, rather than simply that something is bought. NASA wants to buy the first car and hope it becomes a good product in the future. Mr. Hanuschak said the working group's interpretation of *commercial* is the broad one, referring to the economy rather than meaning only that a contract vehicle will be used.

Mr. Hanuschak said NASA is planning to brief senior management on the results of the near-Earth study and then share those results with as many people as possible. Mr. Emond added that Charles Miller, NASA's Senior Advisor for Commercial Space, has briefed Deputy Administrator Lori Garver on the workings of the working group thus far, including the issue of loan guarantees. Mr. Hanuschak said the hope is that management will fold it more into NASA operation.

In response to a question from Mr. Lounge, Mr. Hanuschak said loan guarantees can be done only with legislation to support them. Mr. Emond commented that the question is still in the exploratory stage at the Office of General Counsel and the Office of Legislative and Intergovernmental Affairs.

Mr. Alexander summarized, saying the working group had identified and prioritized capabilities and barriers and how NASA can address those.

Mr. Hanuschak explained that the group is ongoing. He was not clear on what the next milestone would be.

Discussion: Assessment of Committee Efforts

Summary of the Past Year

Mr. Alexander said the Committee had not yet heard a response from NASA to the recommendation it had submitted about the FAA licensing issue. There is no law requiring NASA to reply to the Committee within a certain time period; there is only FACA, subject to Agency interpretation.

Plan for the Coming Year

The next issue, Mr. Alexander said, is a transition plan to a world in which NASA relies on commercial services.

Mr. Alexander asked the Committee for suggestions for topics to consider within the next year. He said the Committee needs to update its work plan for the NASA Advisory Council (NAC) meeting scheduled for February 9 – 11 at NASA Headquarters. He raised the issue of turning the payload aspect of the International Space Station (ISS) over to a not-for-profit model.

Mr. Lounge said he thought the Committee was not finished with the Commercial Crew issue. The Committee might have to wait for a response. Currently the approach is that the company has to fit into NASA's program, rather than that NASA and the company work for mutual advantage. Mr. Lounge referred to a recent crew services document he had seen; it is prescriptive to a very low level. He suggested that instead NASA should make the goals high jumps – clear the bar – and broad jumps – see how far you can get.

Mr. Alexander suggested a recommendation to express Mr. Lounge's concern: that the culture has not caught up with the vision and direction and that thus the process is stifled. The attitude of requiring companies to do things NASA's way rather than "Let's see what commercial can do" will have a negative effect on a lot of things including Commercial Crew, and what survives a highly prescriptive process is less likely to be applicable to the non-NASA markets and therefore less cost competitive and therefore likely to be successful than is something designed to meet high jump and broad jump requirements..

Mr. Lounge said this amounts to a capability-based program rather than a requirement-based program. He referred to the COTS program as an example of a good way to carry this out. Rather than saying, "Suppliers bid on this job," COTS said, "You suppliers bid on the parts of this job you think you can do and we'll put it all together." Mr. Alexander replied that the link is that the attitude that is exhibited is going to too narrowly prescribe the outcome for Commercial Crew, which will reduce its business effectiveness. He suggested that this issue be expressed in a finding. Mr. Emond suggested timing the finding to make it part of the Committee's presentation to the NAC in February. Mr. Alexander commented that first the finding would have to be deliberated, whether via telephone or at another meeting.

Mr. Alexander reminded the Committee that it had recommended four and a half months ago that NASA and FAA get together to work the FAA licensing issue with all due haste, and had not received a response. He did not want the issue to continue to be delayed. Mr. Levin suggested that the Committee issue a related recommendation. There were suggestions of statements that the anticipated progress has not come about, that there has not been much change in the concerns originally voiced, and that the approach the Committee has heard is not one of engagement, continuous discussion, and follow-through that would lead to a meeting of the minds.

Mr. Levin suggested that a recommendation, rather than a finding or observation, would be the appropriate way to follow up on the Committee's earlier recommendation. General Hard suggested a recommendation that NASA pursue and understand the potential problem it will face in maintaining services that would be licensed by FAA for non-NASA missions and by NASA for NASA missions. Questions raised include what effect the arrangement would have on providers and whose rules would apply in a hybrid mission. Ms Smith pointed out that FAA is a regulatory agency but NASA is not.

There was a suggestion that the recommendation start with a preamble noting that there had not been much progress.

Mr. Alexander explained that the Committee had recommended FAA licensing to the NAC. The final result was a recommendation [from the NAC?] that NASA have dialogue with FAA and resolve the issue. The issue has not been resolved. The Committee has to show what the impact will be. General Hard suggested that the Committee say there will be an impact and ask how NASA plans to mitigate it. Mr. Alexander promised to draft the recommendation and circulate it to the Committee.

General Hard commented that it seems NASA has defined *commercial* to mean *via contract*, and NASA assumes that that satisfies the obligation for commercial capability without real attention to or understanding of the commercial capability that is available. He asked whether NASA would live with two definitions or, alternatively, seek to grow commercial space as a sector of the economy that will come to look like other sectors, like aerospace or agriculture.

General Hard used the analogy of business in the Antarctic. He suggested that space is more like the Antarctic than it is like the East and West Coasts, in that it is not obvious that businesses will profit from being able to travel there.

Someone said it is not obvious that there is an enormous market in space and asked what NASA's role is in developing those markets. Mr. Lounge said the Committee's role is related to NASA's charter. Is it to advise Administrator Bolden to take advantage of truly commercial services, or it to advise Administrator Bolden to stimulate a true space economy? Mr. Alexander suggested that the Committee's role

is to help Administrator Bolden decide on which areas in its mission capabilities can be turned over to the commercial sector and then how to do that.

Mr. Lounge pointed out that there is a trade to be made between what benefits NASA's programs and what benefits the commercial sector. He asked if NASA's role is just to carry out its programs and buy commercial service that is available.

Mr. Alexander commented that getting people into space for non-government purposes is the necessary spark for anything else to happen in commercial space. General Hard commented that getting people into space would have to be tied to getting people to other places rather than just into orbit – and moving cargo. Presence in space is nothing more than a platform. He asked whether the future economic value of commercialized space is about being in orbit or about going to other places and taking some treasure there or back. Mr. Alexander replied that you have to get to low-Earth orbit first, whether it is an end or just a step along the way.

Mr. Alexander commented that there is a definition of *commercial* in the National Space Policy that was issued by the White House in June 2010. He quoted the definition: "The term 'commercial,' for the purposes of this policy, refers to space goods, services, or activities provided by private sector enterprises that bear a reasonable portion of the investment risk and responsibility for the activity, operate in accordance with typical market-based incentives for controlling cost and optimizing return on investment, and have the legal capacity to offer these goods or services to existing or potential nongovernmental customers." Mr. Alexander suggested that the Committee review the new definition, discuss its interpretation, and perhaps seek clarification. As a topic for the next meeting, Mr. Alexander suggested the question of what is actionable from an Administrator's standpoint.

Mr. Emond suggested that for the next meeting, local people could meet at NASA Headquarters and others who wish to attend could engage by telephone.

There was discussion about a comment that Will Trafton, a Committee member who was not able to attend the current meeting, had e-mailed. The comment concerned non-profit of managing commercial services. This is an area of emerging Agency focus. Mr. Alexander asked what happens if there are commercial alternatives. Mr. Levin agreed that that is a topic to discuss: What happens when NASA is competing with an alternative technology? If Bigelow and NASA are performing the same task, he asked, should NASA be competing with Bigelow?

Mr. Emond pointed out that there already exists competition between science and the commercial sector. Soon the focus could shift to the ISS: How much space there is allocated for science and how much for commercial purposes.

Mr. Levin suggested that the Committee invite representatives of Zero-G Corporation to a meeting. Mr. Emond agreed, saying a discussion with Zero-G might

open up the Committee to providing guidance in areas of commercial space other than commercial crew and cargo.

If there are capabilities that government provides, Mr. Levin asked, how does the transition take place? Should it be phased?

Mr. Alexander expressed the opinion that the ISS cannot be commercialized, because it is international. It is possible that research that NASA performs on the ISS may be performed more cost-effectively if it is done commercially. Zero-G, on the other hand, can be commercialized. To try to commercialize the ISS would be to wade into a dispute [not sure I got this right].

Mr. Emond asked how, in a nonprofit system, commercial payloads will compete with projects that are purely for NASA. What are the protocols, the selection criteria? Will there be a chilling effect for commercial entities wanting to use the ISS but not meeting the criteria?

Mr. Alexander summarized potential new topics to address:

- the definition of *commercial*;
- commercial utilization of the ISS, with Zero-G as an example;
- the FAA licensing issue; and
- public outreach.

Plan for the Next Meeting

It was agreed that the next meeting would be held at NASA Headquarters, probably on February 8, so that people could easily attend both the Committee meeting and the NAC meeting on February 9 – 11. If the meeting is open under FACA, Mr. Emond commented, notice must be issued 30 days prior.

Mr. Alexander suggested fact-finding briefings in the morning, from Bryan O'Connor; NASA's Chief of Safety and Mission Assurance [?]; Bill McAllister, and [?]; and a briefing from Damon Wells of the Office of Science and Technology Policy on policy on commercial space.

Mr. Emond closed the meeting at 4:30 pm. A meeting report will be posted on the Chief Technologist's Web site.

Appendix A, Meeting Agenda

for the part of the meeting that was open under FACA

- 1:30 Lars Perkins, Acting Chair, Education and Public Outreach Committee,
 with Miles O'Brien joining by telephone
- 2:15 Charles Miller on NASA Commercial Space Working Group
- 3:00 Assessment of Committee Efforts
 - Review of Committee briefings and meetings over past year
 - Direction for Committee in coming including commercial space areas
 not yet addressed by the Committee
- 4:15 Administrative discussion of meeting locations near term in the coming
 year
- 4:30 Adjourn

Appendix B, Committee Membership

Bretton Alexander, Committee Chair
President, Commercial Spaceflight Federation

John Emond, Executive Secretary
Innovative Partnerships Program/Office of Chief Technologist
NASA Headquarters

Major General Donald Hard
U.S. Air Force (retired), independent consultant

Dr. Bernard Harris
CEO, Vasalius Ventures
Former astronaut, former SPACEHAB executive

Lon Levin, Committee Vice Chair
Co-founder, XM Satellite Radio and other satellite businesses

John Michael Lounge
Former astronaut
Former Boeing executive

Patti Grace Smith
Former FAA Associate Administrator for Commercial Space Transportation
Independent consultant

Wilbur C. Trafton
Former NASA Associate Administrator for Space Flight
Former executive at ILS and Kistler Aerospace